REMARKS

This paper is filed in response to the Office Action mailed on June 7, 2004. A petition for a two-month extension is being provided. Currently, Claims 14-62 are pending in the application. Claims 39-57 and 59-61 are allowed. Claims 16-18, 20, 22, 23, 26-30 and 33-77 are objected to as being dependent upon a rejected base claim, but are otherwise allowable. Claims 14, 15, 19, 21, 24, 25, 31, 32, 38, 58 and 62 are rejected. Of the rejected claims, Claim 38 is amended and Claim 62 is canceled without prejudice. Claims 63-83 are new. Consideration and allowance of Claims 14-61 and 63-83 is respectfully requested.

The Rejection of Claims 14, 15, 19, 21, 24, 25, 31, 32, 38, 58 and 62 Under 35 U.S.C. § 102(b)

Claims 14, 15, 19, 21, 24, 25, 31, 32, 38, 58 and 62 are rejected under 35 U.S.C. § 102(b) as being anticipated by Yamaguchi et al. (JP-A No. 3-98632 translation).

As an initial matter, the independent Claims 14, 24, 31 and 58 recite having proton conductivity and having ion exchange groups. As now amended, Claim 38 recites "monomers each having an ion exchange group" out of which the polymer is constructed. Claim 62 is canceled.

For a reference to be anticipatory, the reference must exactly describe the claimed invention. Applicants submit that the Yamaguchi reference does not describe either proton conductivity, ion exchange groups or monomers having ion exchange groups.

The polymer disclosed in the Yamaguchi reference (JP-A No. 3-98632) does not have proton conductivity and is not derived from monomers having an ion-exchange group. The example of the Yamaguchi reference (JP-A No. 3-98632) discloses using methyl acrylate as a monomer, and obtaining poly(methyl acrylate) as a resulting polymer.

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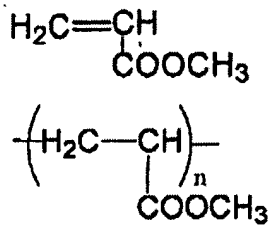
Methyl acrylate and poly(methyl acrylate) have the following chemical structure:



Methyl acrylate

and

Poly (methyl acrylate)

The $-COOCH_3$ group in the structure of methyl acrylate is not an ion-exchange group, since the $-COOCH_3$ group cannot carry a proton and therefore, cannot easily release a proton. Furthermore, the term "ion-exchange group" is defined in the present specification on page 4, lines 16-18, as follows:

> The term "ion-exchange group" herein refers to a group, which carries and easily release proton such as $-SO_3$ from $-SO_3H$ group

Accordingly, poly(methyl acrylate) does not have proton conductivity since the $-COOCH_3$ group is not an ion-exchange group and the dissociation constant (pKa) of methyl acrylate and poly(methyl acrylate) are very low (not detectable). Applicants submit that the pKa value is an indication of whether a compound easily releases a proton, and therefore whether the compound has proton conductivity. The pKa of poly(methyl acrylate) is not detectable, since poly(methyl acrylate) is not dissociated because of its chemical structure.

Applicants have measured proton conductivities of the electrolyte membrane described in one example of the present application and the separation membrane of Yamaguchi (JP-A No. 3-98632).

According to applicants' results, proton conductivity of the electrolyte membrane described in one example of the present application ranges from about 10^{-4} S/cm to 10^{-3} S/cm.

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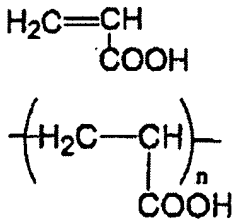
On the other hand, proton conductivity of the separation membrane described in an example of the Yamaguchi reference was not detectable, since the proton conductivity of the separation membrane is lower than the sensitivity of the method used in measuring. The lowest detectable proton conductivity of the measuring method is about 10^{-5} S/cm, since 10^{-5} S/cm corresponds to the proton conductivity of water on the surface of the membrane.

In direct contrast to the Yamaguchi reference, the polymer included in Claims 14, 24, 31 and 58, and amended Claim 38 of the present application has proton conductivity and is derived from monomers having an ion-exchange group. One example of the present application describes using acrylic acid (AA) as a monomer and obtaining poly(acrylic acid). Acrylic acid (AA) and poly(acrylic acid) have the following chemical structure:



Acrylic acid

, and

Poly (acrylic acid)

The -COOH group in the structure of acrylic acid is an ion-exchange group since the -COOH group can carry a proton and can easily release a proton. Furthermore, in contrast to the Yamaguchi reference, poly(acrylic acid) has a proton conductivity of about 10^{-4} S/cm* since the -COOH group is an ion-exchange group and the pKa value of poly(acrylic acid) of 4.25 (depending on the measuring temperature) is much higher than that of poly(methyl acrylate).

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Request for Interview

If the Examiner finds it necessary, and at the Examiner's permission, applicants' attorney would like to request a telephone interview with the Examiner to discuss the rejected claims and the Yamaguchi et al. reference.

Allowable Subject Matter

Applicants note with appreciation the allowance of Claims 39-57 and 59-61. Applicants further note with appreciation the indication of allowable subject matter in Claims 16-18, 20, 22-23, 26-30 and 33-37. These claims are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. For the reasons discussed above pertaining to Claims 14, 24 and 31, applicants submit claims 39-57 and 59-61 are allowable.

Amended Claims 14, 15, 19, 23, 24, 30, 31, 38, 39, 42, and 49

Claims 14, 15, 19, 23, 24, 30, 31, 38, 39, 42, and 49 are nonsubstantively amended to change the form of the verb "comprised" to a more appropriate form.

New Claims 63-83

Claims 63-83 include the subject matter of canceled Claim 62 and provide further features by way of dependent claims.

CONCLUSION

In view of the foregoing amendments and remarks, applicants submit that Claims 14-61 and 63-83 are allowable. Accordingly, an early notice of allowance is respectfully requested. If necessary, applicants remind the Examiner that applicants are willing to have a telephone interview concerning this Office Action. If necessary, applicants respectfully request the cooperation of the Examiner to delay acting on this application until such time as a telephone

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interview is conducted. If the Examiner has any further questions or comments, the Examiner is invited to contact the applicants' attorney at the number provided below.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service in a sealed envelope as first class mail with postage thereon fully prepaid and addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below date.

Date: November 8, 2004

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